



Vurderinger rundt mat, klima og bærekraft

Hvordan ser klimafremtiden ut for landbruket?
CIENS Frokost webinar, 31. mai 2023

Bob van Oort, CICERO

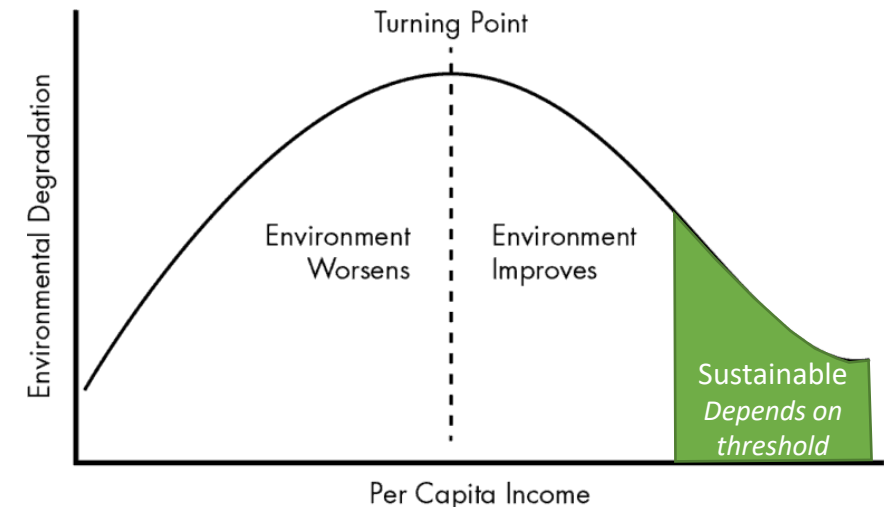
Bærekraftig utvikling

The Brundtland Report (1987) was intended to respond to the conflict between **globalized economic growth** and **accelerating ecological degradation** by redefining "economic development" in terms of "sustainable development".

Definition: "Meeting **the needs of the present** without compromising the **ability of future generations to meet their own needs.**"

1. **Temporal** aspect (generations): now and future
2. **Geographical** aspect: mostly local, climate was not yet in the picture – with climate a clear local to global link
3. **Multiple sustainability** aspects (environment, socio-economic)
4. **Needs** – not *Wants*

1987 «Brundtland report»



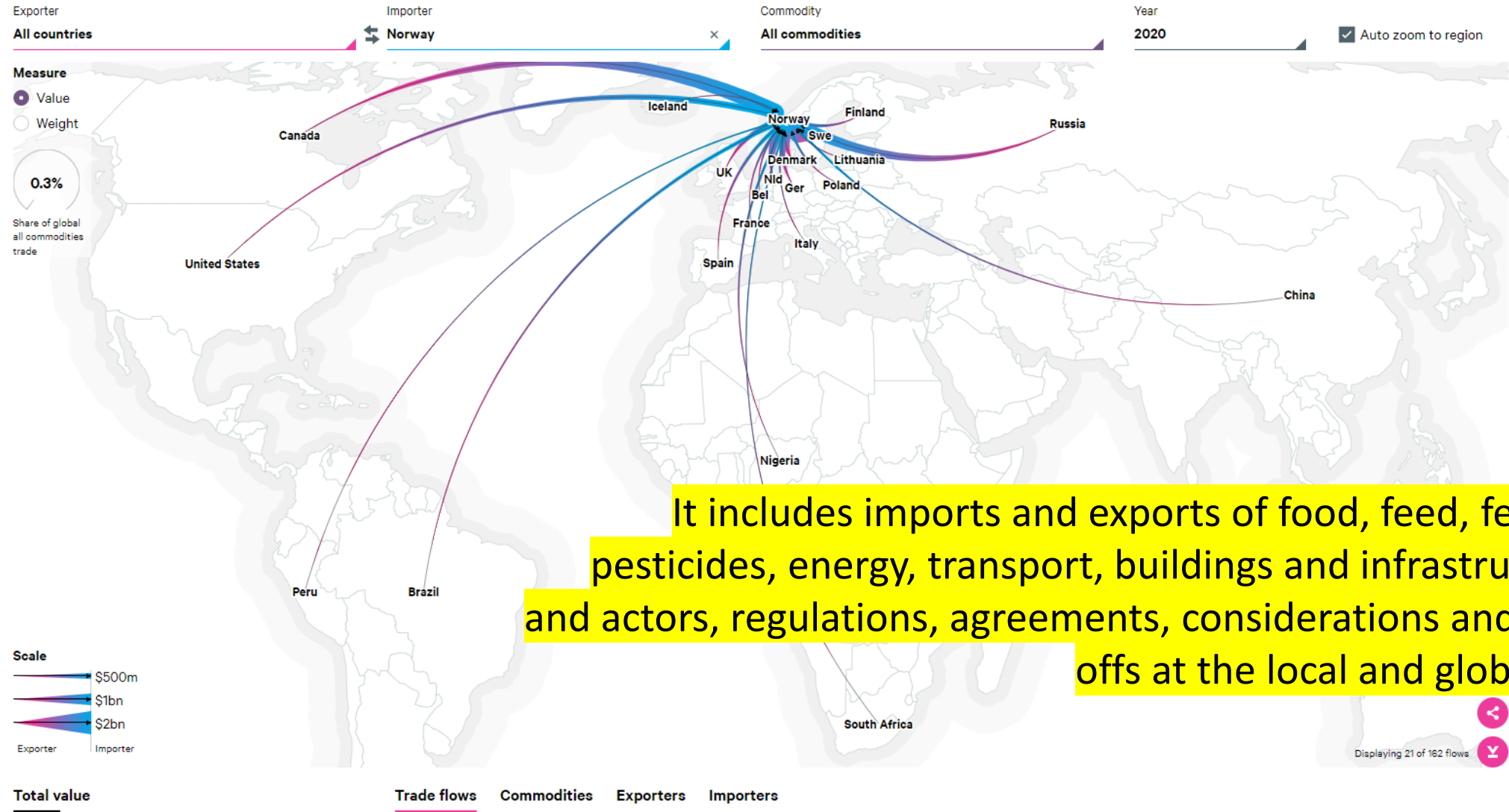
Mat en integrert del i alle bærekraftsmål



«Food»

- Goal 2 (102)
- Goal 1 (61)
- Goal 14 (57)
- Goal 12 (49)
- Goal 13 (48)
- Goal 17 (48)
- Goal 8 (46)
- Goal 6 (44)
- Goal 15 (38)
- Goal 3 (36)
- Goal 5 (34)
- Goal 7 (27)
- Goal 9 (23)
- Goal 11 (22)
- Goal 10 (21)
- Goal 4 (18)
- Goal 16 (8)

Matsystemet er mer enn lokal mat



It includes imports and exports of food, feed, fertilizer, pesticides, energy, transport, buildings and infrastructure – and actors, regulations, agreements, considerations and trade-offs at the local and global level

Våre matproduksjons og -forbruksvalg transformerer vår verden



Agriculture is responsible for

80%

of global deforestation



Food systems release

29%

of global GHGs into the air



52%
of agricultural land is degraded



Drivers linked to food production cause

70%

of terrestrial biodiversity loss



Drivers linked to food production cause

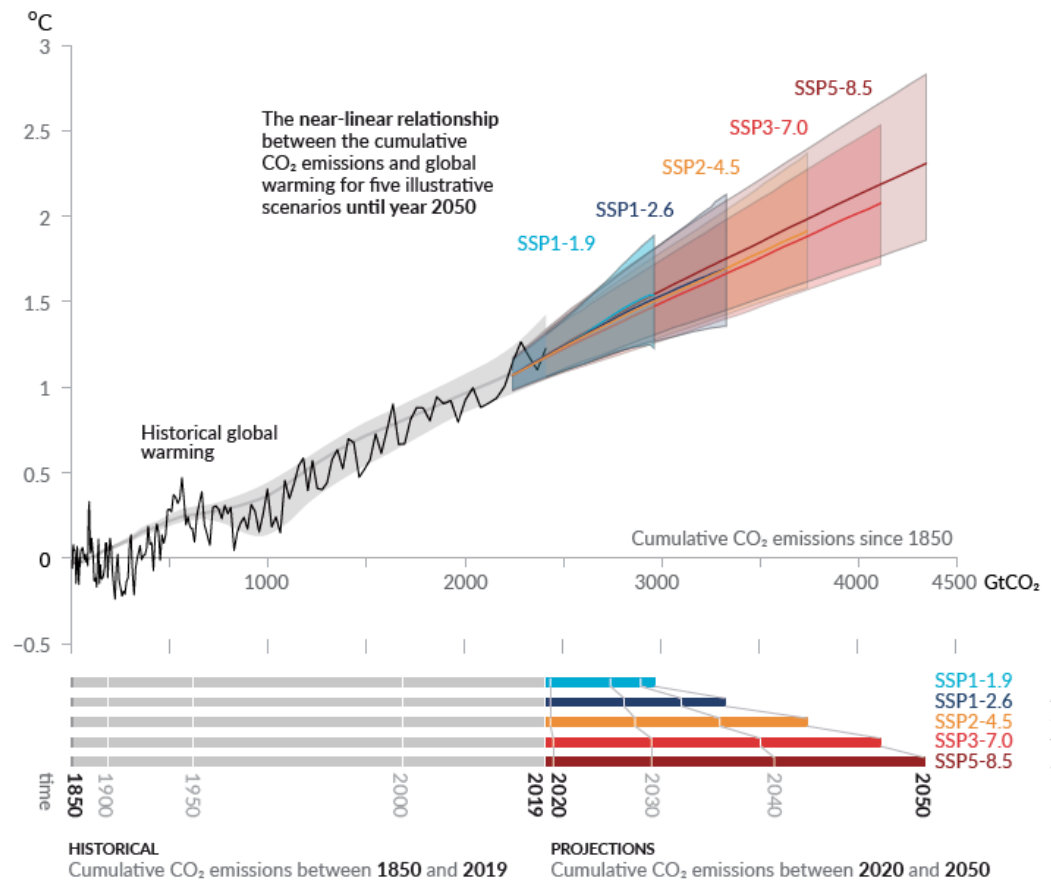
50%

of freshwater biodiversity loss

Karbonbudsjettet – lite igjen, mest til «andre»

Every tonne of CO₂ emissions adds to global warming

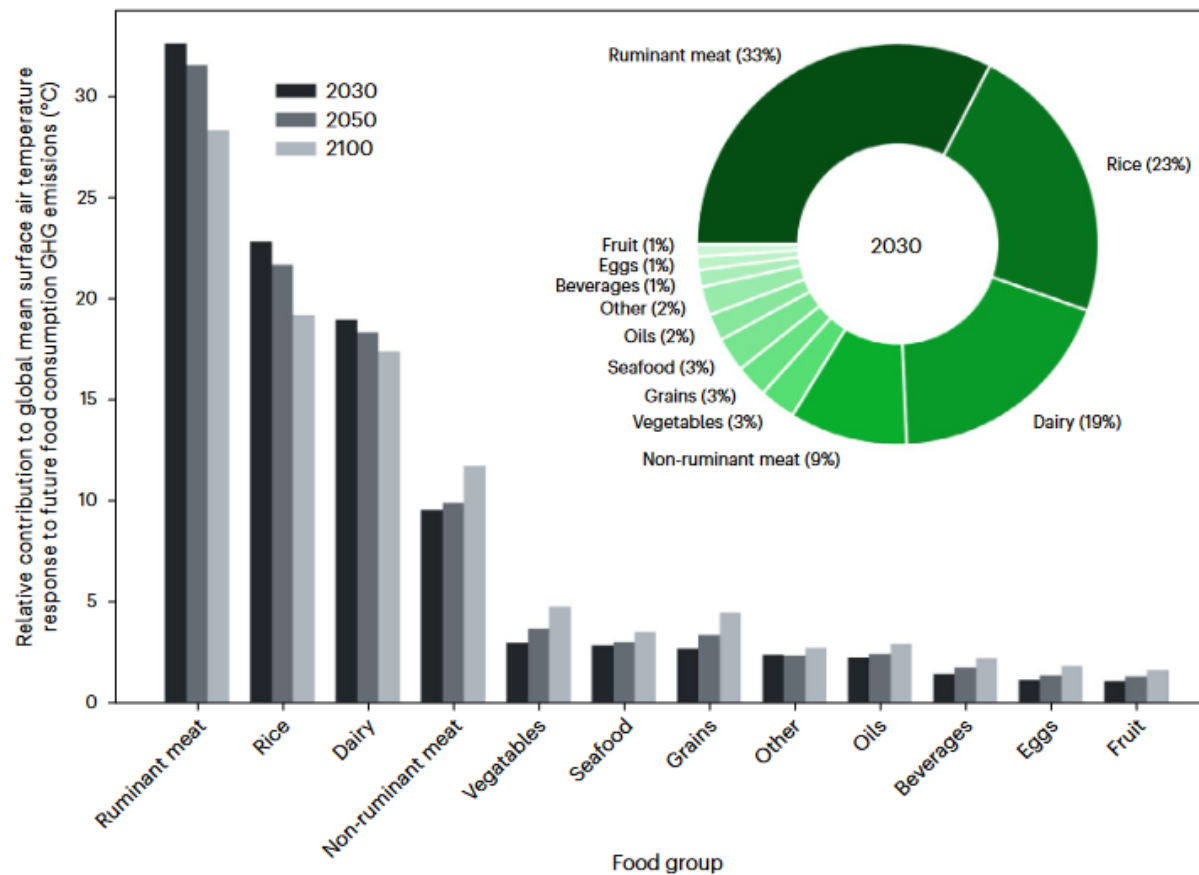
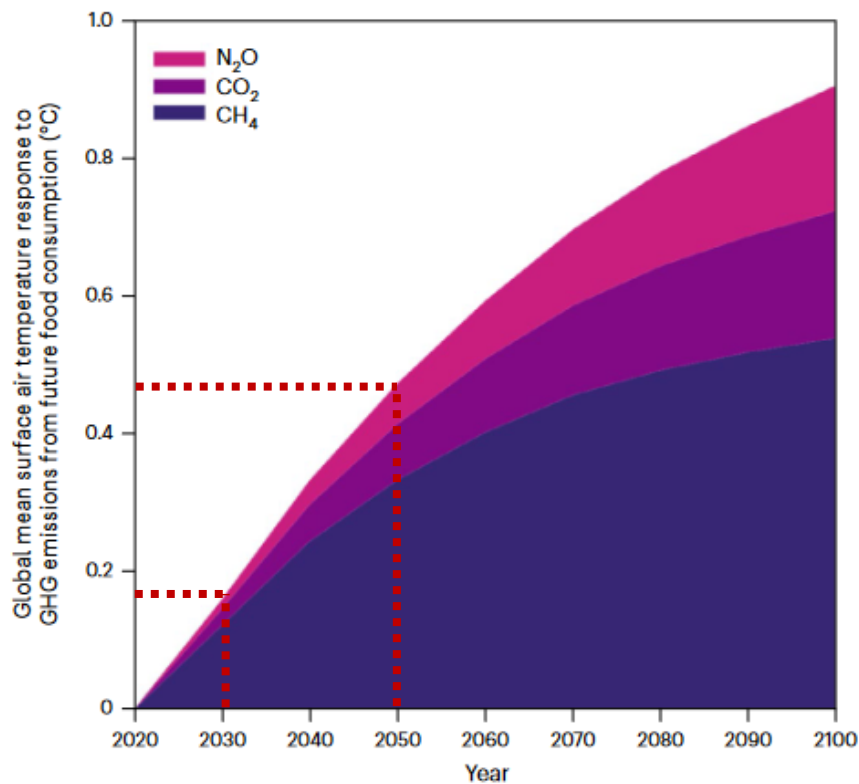
Global surface temperature increase since 1850–1900 (°C) as a function of cumulative CO₂ emissions (GtCO₂)



- 1) Continued emissions
- 2) Remaining carbon budget determines future warming
- 3) Largest part of remaining carbon budget for developing nations!
- 4) Rapid and deep cuts are needed – in ALL gases



Matsystemet vil bidra med nesten 1°C ved 2100, 75% fra drøvtyggere og ris





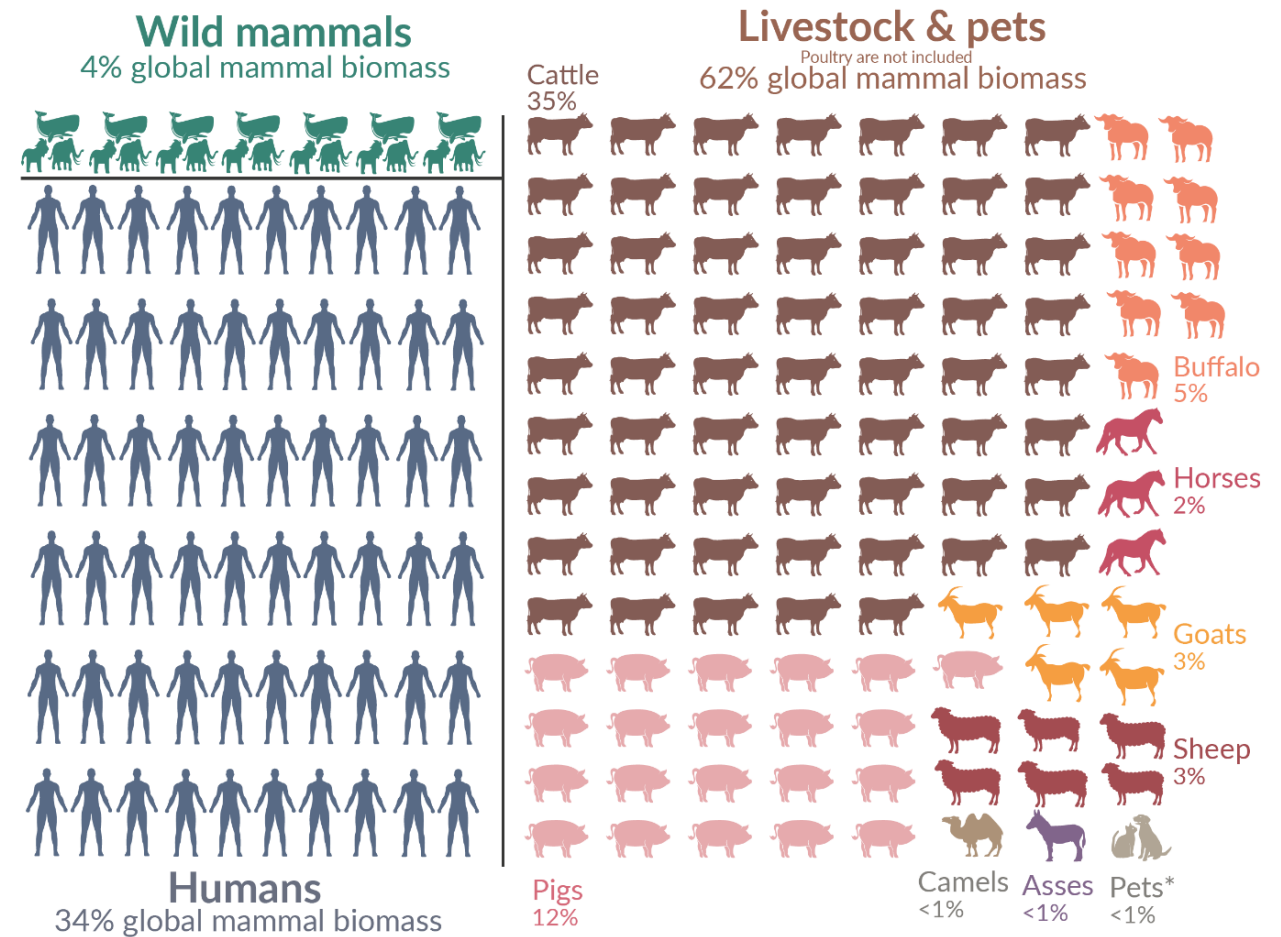
Hva vi spiser og hvordan vi produserer påvirker biomangfold

Rundt 60% av verdens pattedyr (biomasse) er husdyr, og 60% av fugler er kyllinger

Distribution of mammals on Earth



Mammal biomass is shown for the year 2015. or or = 1 million tonnes carbon (C)



*Bar-On et al. (2018) provide estimates of livestock only, without estimates of mammalian pets (e.g. cats and dogs). Pets have been added as an additional category based on calculations from estimates of the number of pets globally and average biomass.
Data source: Bar-On et al. (2018). The biomass distribution on Earth. Images sourced from the Noun Project.
OurWorldinData.org - Research and data to make progress against the world's largest problems. Licensed under CC-BY by the author Hannah Ritchie.



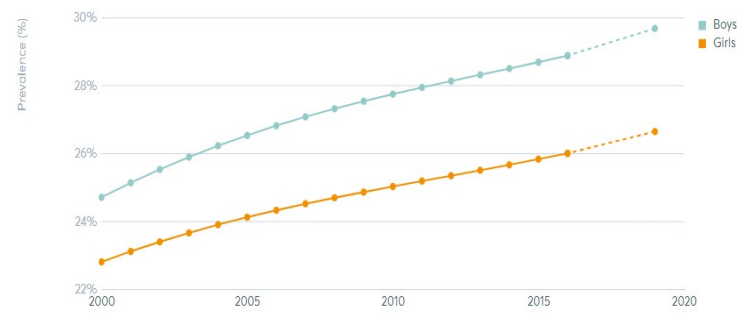
Hva vi spiser og hvordan vi produserer påvirker vår (og dyrenes) helse

Child and adolescent nutrition status

Prevalence of thinness, overweight and obesity in children and adolescents aged 5–19 years

Select indicator:

- Thinness
- Overweight**
- Obesity

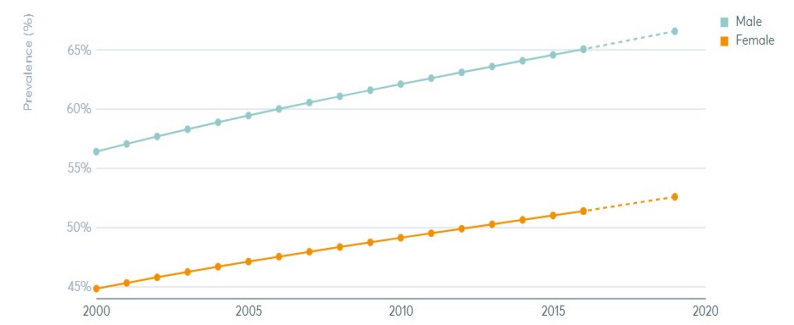


Adult nutrition status and disease

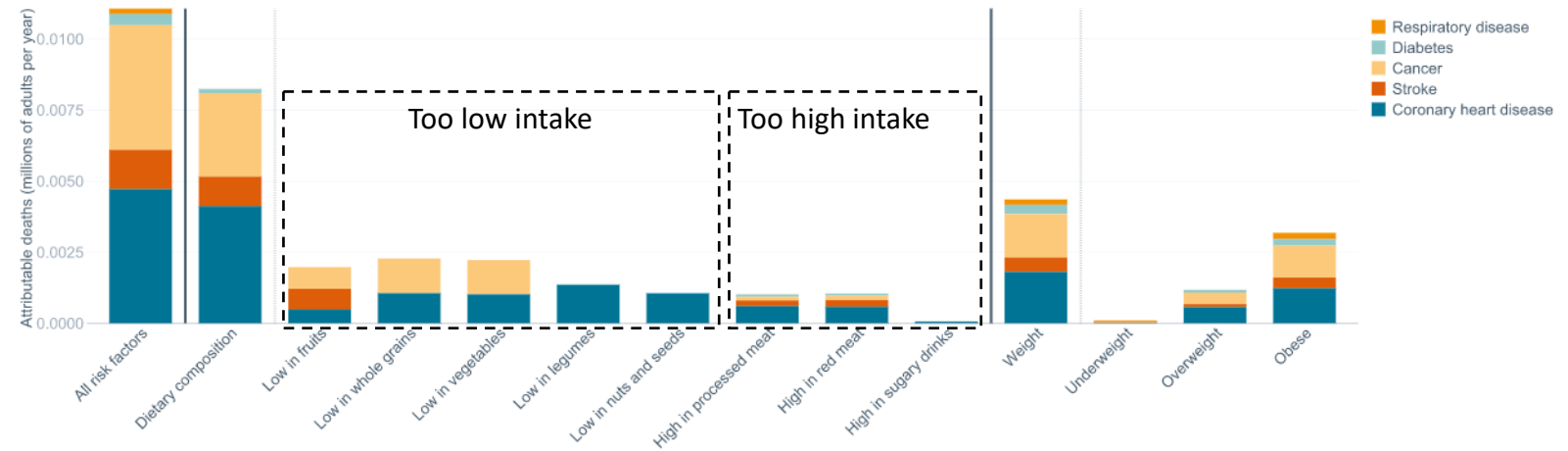
Prevalence of underweight, overweight and obesity in adults aged 18 years and over

Select indicator:

- Underweight
- Overweight**
- Obesity



Mortality attributable to dietary composition and weight



Source: Global Nutrition Report, Country profiles 2023

<https://globalnutritionreport.org/resources/nutrition-profiles/europe/northern-europe/norway/#diet>

Globale forskjeller og lokale nyanser!!

«Development» and consumption is different among nations

Environmental degradation and biodiversity impacts differ

National emissions and climate change impacts differ

--

We don't live in a bubble ...



Local choices and behaviour have both **local** (environmental, land use, socio-economic) AND **global** (climate change) **consequences**

Konsekvenser: forskjeller i risiko

Scenario

CLIMATE CHANGE (since 1780)

1.5°C 2.0°C 3.0°C

SOCIOECONOMICS (from sustainability to rocky road)

SSP1 SSP2 SSP3

VULNERABILITY THRESHOLD (US\$/day income)

Indicator Score

Indicators

Multi-sector risk

WATER SECTOR

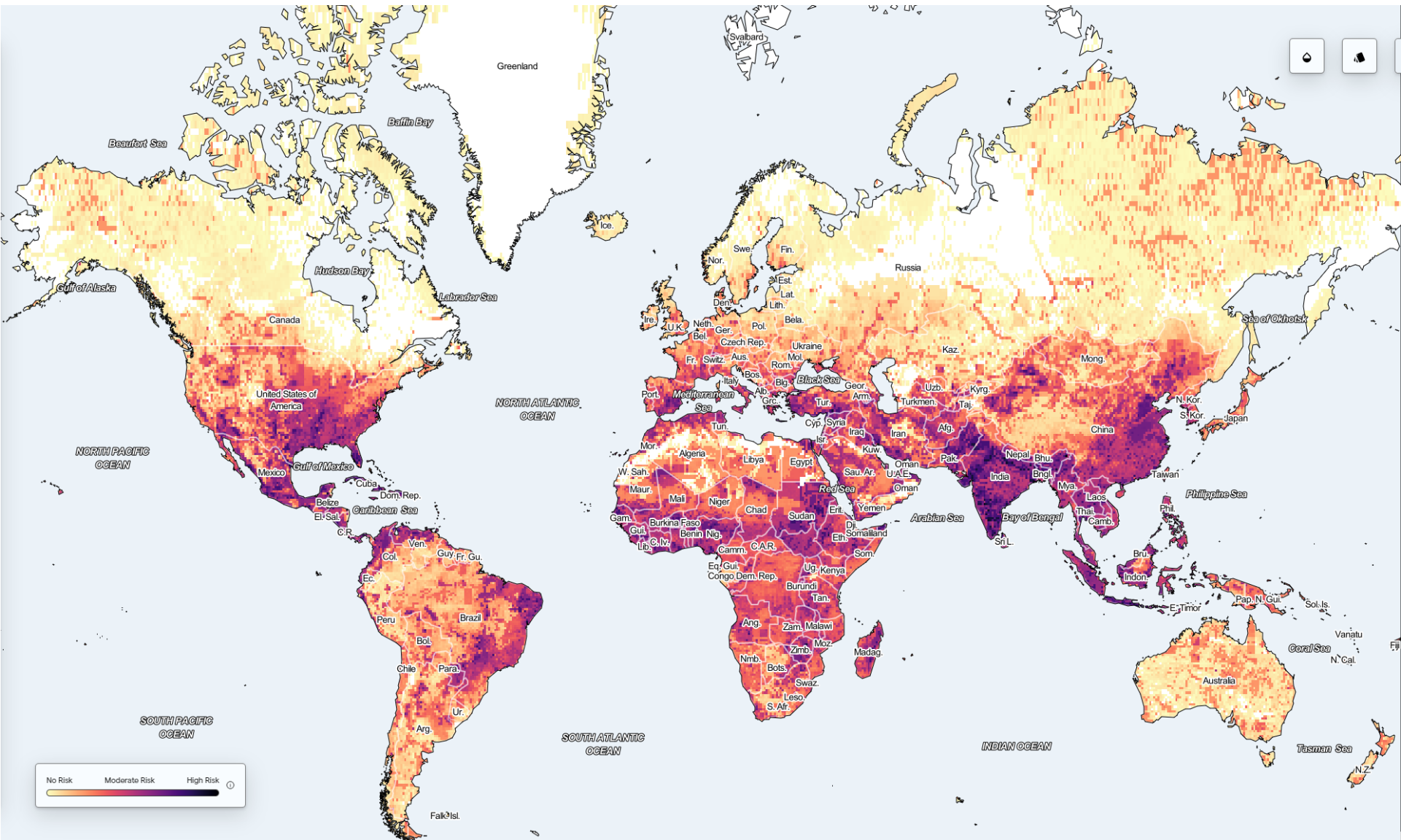
- Water stress
- Groundwater stress
- Drought intensity
- Peak flows
- Seasonality
- Inter-annual variability

ENERGY SECTOR

- Clean cooking access
- Heat stress
- Cooling degree days
- Hydroclimate risk to power plants

LAND SECTOR

- Crop yield change
- Agricultural water stress
- Habitat degradation
- Nitrogen leaching



Scenario

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SOCIOECONOMICS (from sustainability to rocky road)

SSP1 SSP2 SSP3

VULNERABILITY THRESHOLD (US\$/day income)

Indicator Score

Sustainable Development Report 2022

Rankings

Rank	Country
1	Finland
2	Denmark
3	Sweden
4	Norway

Norway ×

Performance by SDG

- SDG1: No poverty
- SDG2: Zero hunger
- SDG3: Good health and well-being
- SDG4: Quality education
- SDG5: Gender equality
- SDG6: Clean water and sanitation
- SDG7: Affordable and clean energy
- SDG8: Decent work and economic growth
- SDG9: Industry, innovation and infrastructure
- SDG10: Reduced inequalities
- SDG11: Sustainable cities and communities
- SDG12: Responsible consumption and production
- SDG13: Climate action
- SDG14: Life below water
- SDG15: Life on land
- SDG16: Peace, justice and strong institutions
- SDG17: Partnerships for the goals

Spillover score: 61.74/100
Spillover rank: 146/163

Environmental and social impacts embodied into trade

- Exports of hazardous pesticides
- Scarce water consumption embodied in imports
- Fatal work-related accidents embodied in imports
- SO₂ emissions embodied in imports
- Nitrogen emissions embodied in imports
- Exports of plastic waste
- CO₂ emissions embodied in imports
- Marine biodiversity threats embodied in imports
- Terrestrial and freshwater biodiversity threats embodied in imports

Economy and finance

- For high-income and all OECD DAC countries: International concessional public finance, including official development assistance
- Corporate Tax Haven Score
- Financial Secrecy Score
- Shifted profits of multinationals

Security

- Exports of major conventional weapons

Food, Climate, Environment and Biodiversity

remain important issues, both home and abroad

Spillover Rankings

124	Finland
137	Denmark
139	Sweden
146	Norway

163

Matsystemet bærekrafts narrativer – Ulike interesser, forståelser, en del «red herrings»

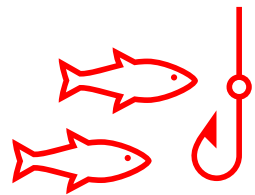
District policy, Grass, biodiversity, meat necessary, tradition, self-sufficiency, low antibiotics, economic cornerstone, klimaku, OSV. ...



Viseantikvaren



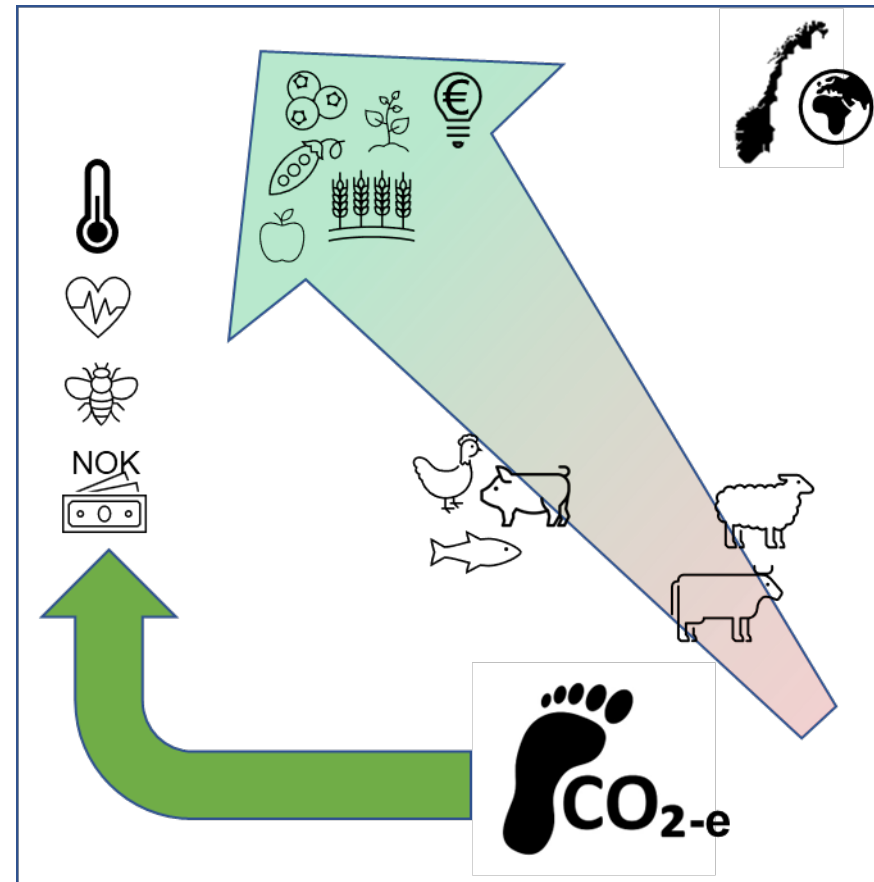
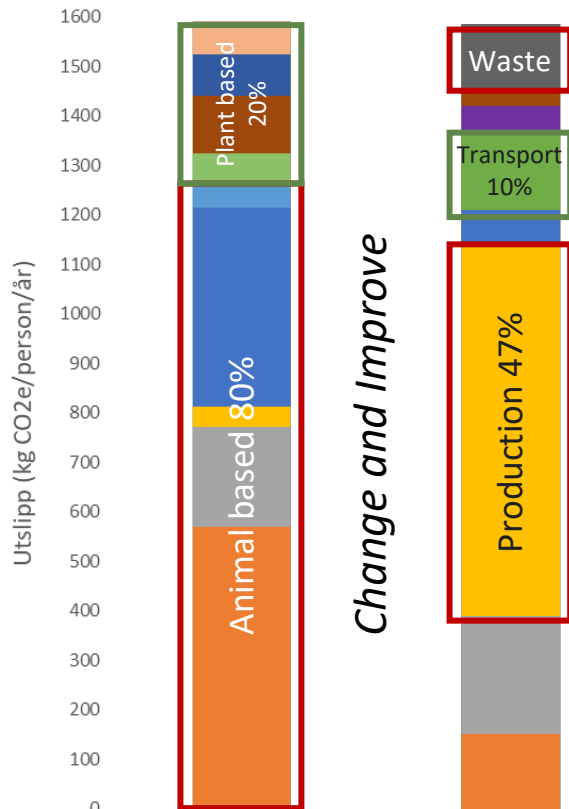
NIBIO, 2022



- Structural changes: low profitability, centralized, industrial > limited grazing, biodiversity changes (also: myr, rainforest).
- Grass on grain-land, highest subsidies in OECD ... are there alternatives?
- Many opportunities – need supporting measures.
- Climate and environment something we MUST deal with

Endring er nødvendig, unngå undergrave «det som er bra»

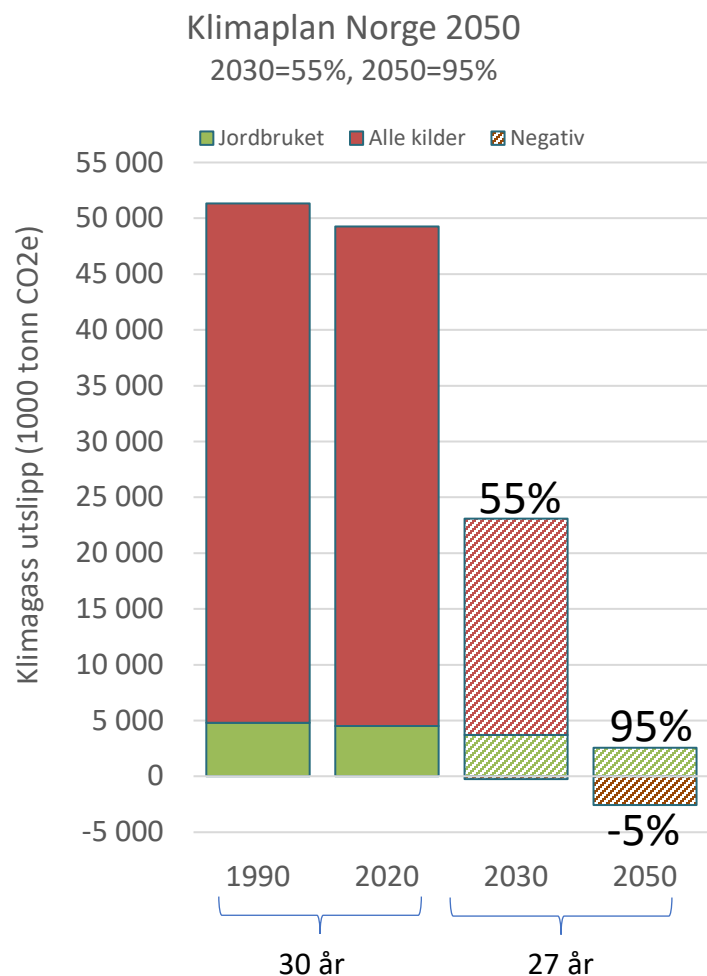
Emissions of Norwegian diet



Sustainability boils down to:

- **Climate, environment, health and biodiversity measures must not undermine other sustainability or land-use goals** (e.g. food security, district policy)
 - **Likewise: food, land-use, agricultural targets must not undermine climate, environment, health, or biodiversity targets!**
- E.g. Produce food, decrease emissions, increase health and biodiversity!

Norske klima- og matproduksjons planer



Nasjonalt:

55% reduksjon ved 2030

95% reduksjon ved 2050, kompensert med karbonlagring

Jordbruk 2021-2030:

5 mT over 10 år

Forbedret fôr og avl - Karbonlagring

Jordbruket mot 2050:

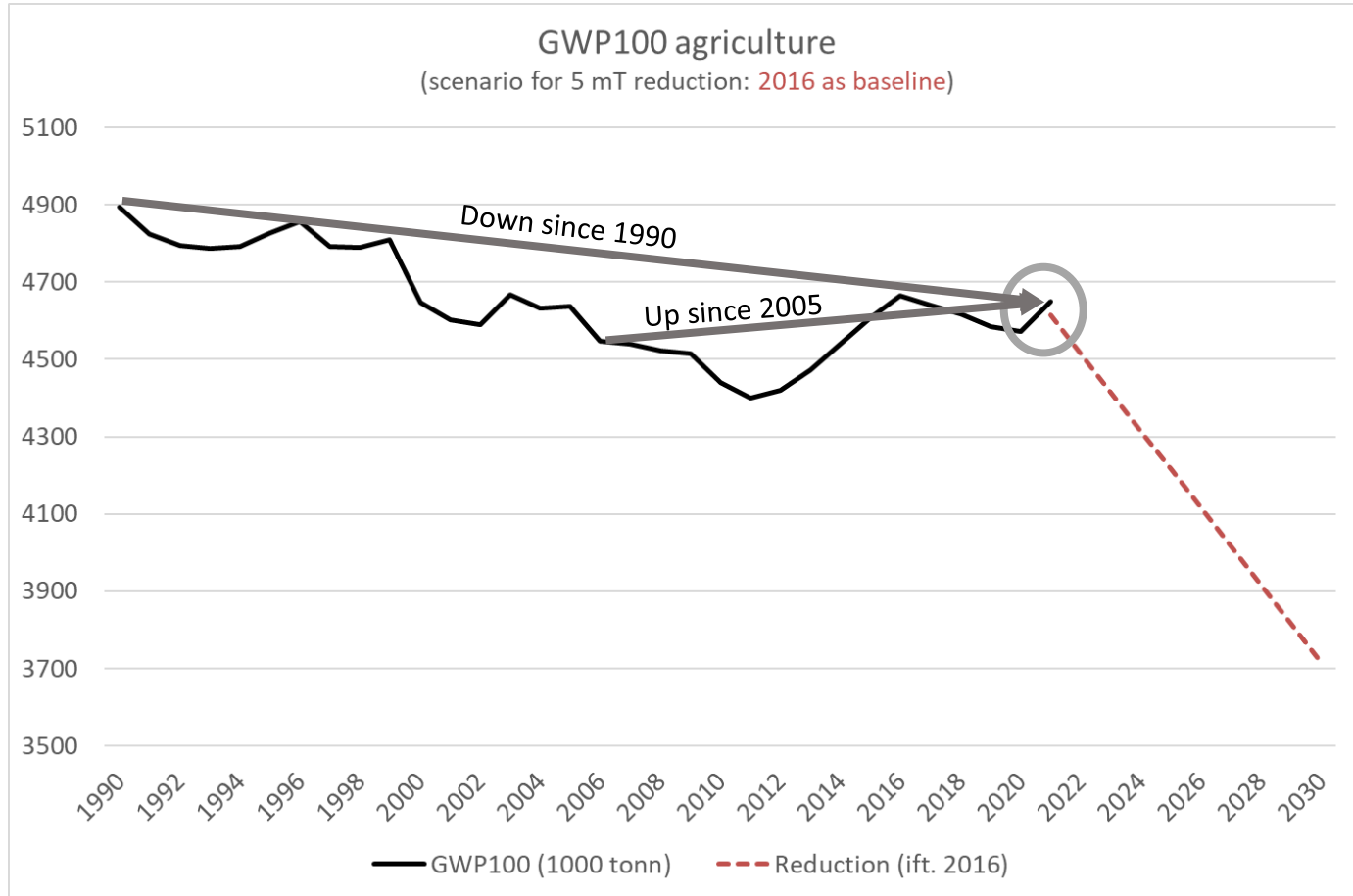
- Halvering av utslippene (v.1990)?
- Utslippskompensering med karbonfangst?
- Økt matproduksjon (kjøtt, matkorn, potet, frukt/grønt)
- Klimatilpassing

Krevende – hva blir konsekvensene?

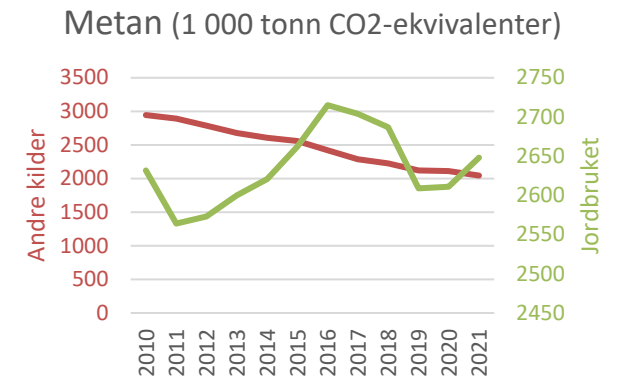
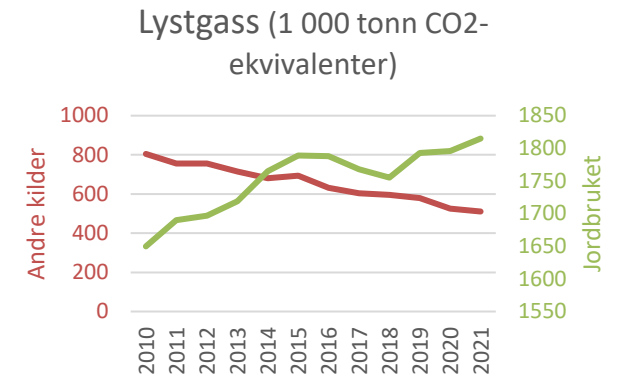
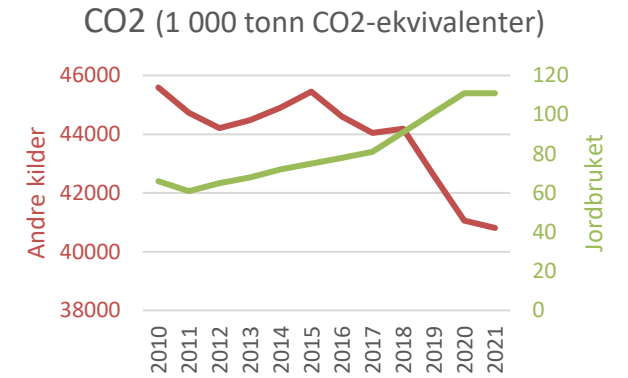
Hele regnestykket for økt norsk selvforsyning:

Økt norskandel	Matkorn (lettet å sette inn virkemidler på)	+2 %	Partnerskapet, kornstrategi. 90% norskandel i matkornet (var 64% i 2021, 75% i 2022)
	Melk, yoghurt, smør og ost	+ 0,8 %	Prosenttoll og tilstrekkelig RÅK-tilskudd. Erstatte alt utenom kvotene.
	Kjøtt og egg	+ 0,7 %	Storfekjøttproduksjon økes til 100 % markedsdekning (obs markedsbalanse). Også andre kjøttslag må dekkes av norsk produksjon, krever konkurransekraft (tollvern og prisnedskrivning).
	Potet	+ 1,1%	Tollvern. Spesialpoteter, bruke lagringspotet og bedra lagringsteknologi. Forbrukerpreferanse. Spis mer potet!
	Frukt, grønt og bær	+0,6 %	Norskandelen går ned! Tollvern (prosenttoll) løk, isbergsalat, knollselleri, kålrot og eple. 75% potet, 50% grønt, 25% bær, 4% frukt.
	Sum	+ 5,2 %	Krever økt areal (600 000 da)
Mer norsk kraftfôrråvare		+ 2 %	I dag: 63% norske råvarer i kraftforet Mål: 76% norskandel i kraftforet= 95% karbohydrater, 60% fett, 50% protein
Mer og bedre grovfôr		Ikke kvantifisert	
Endra kosthold		3,0 %	Ris og pasta erstattes av poteter Margarin og fett, sukker erstattes av smør, fløte og norsk frukt og bær.
Sum		10,2 %	

Utslippstrend i Norsk jordbruk

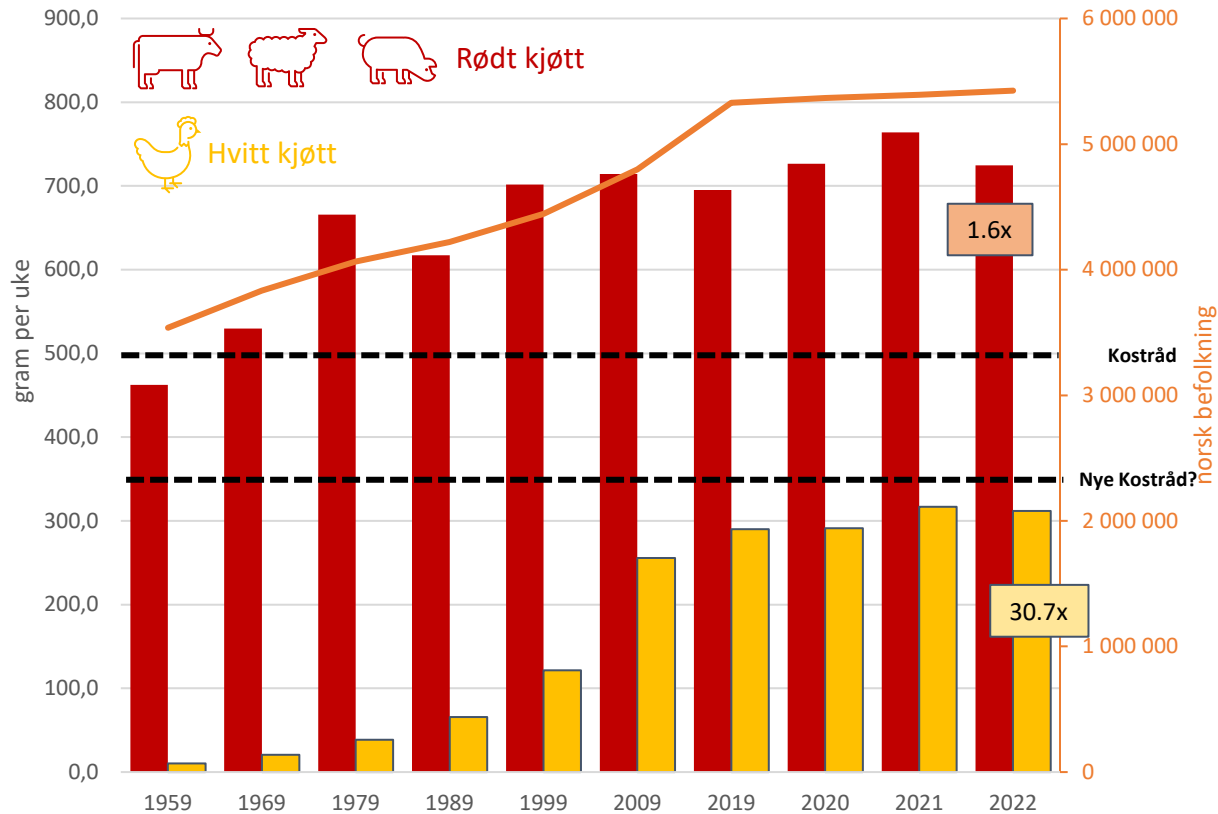


Source: Statistics Norway

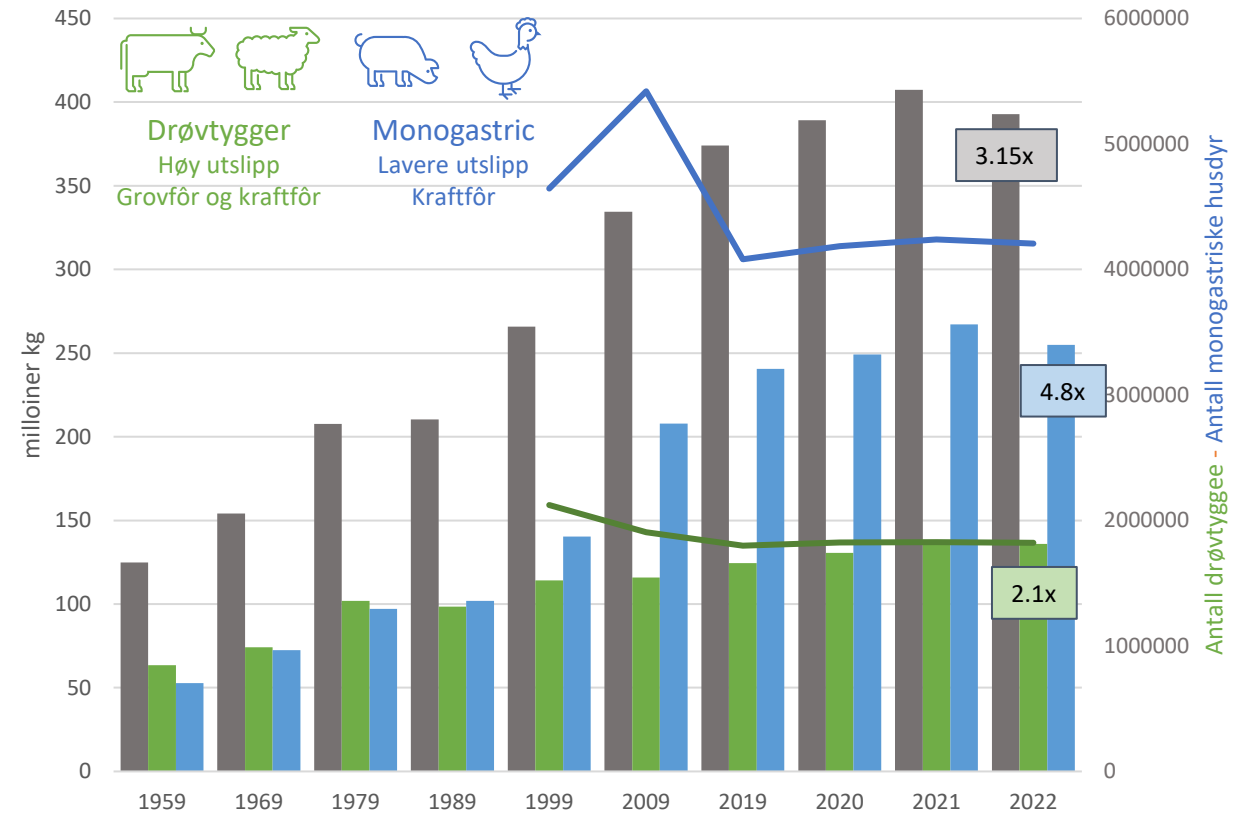


Endringer i kjøttforbruket, per person og totalt

Reelt kjøttforbruk per person - helseperspektiv



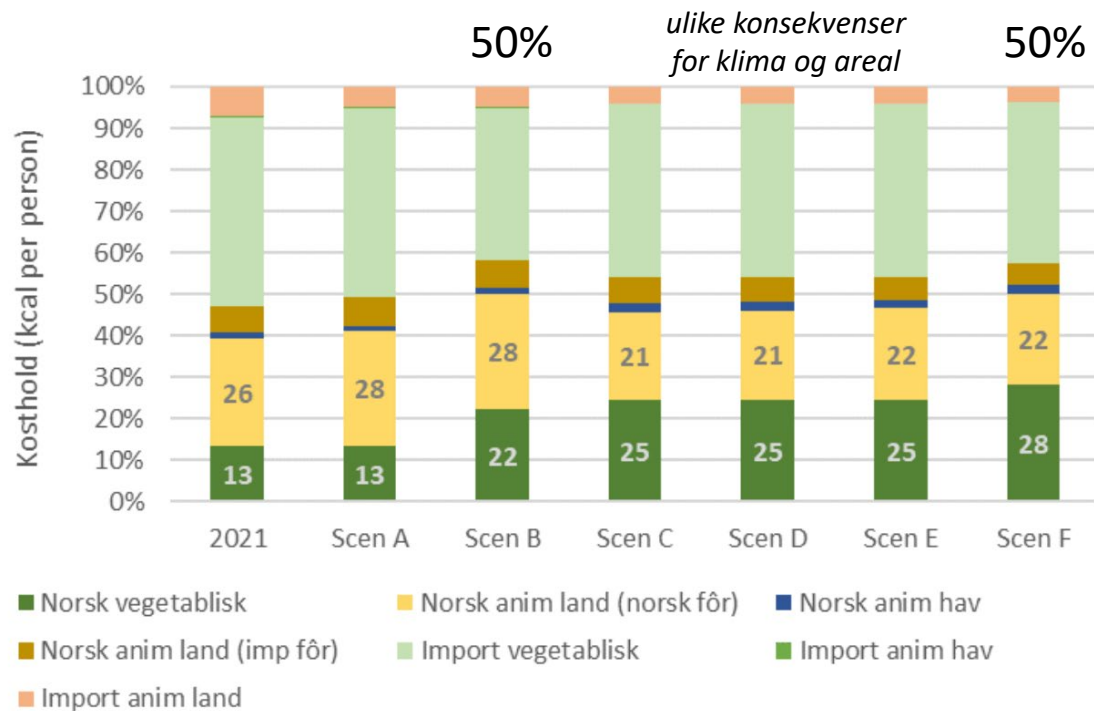
Totalt kjøttforbruk - miljøperspektiv



Bearbeidet fra: Helsedirektoratet 2022 – Endringer i norsk kosthold

Selvforsyningsgrad: Muligheter og forbruksvalg

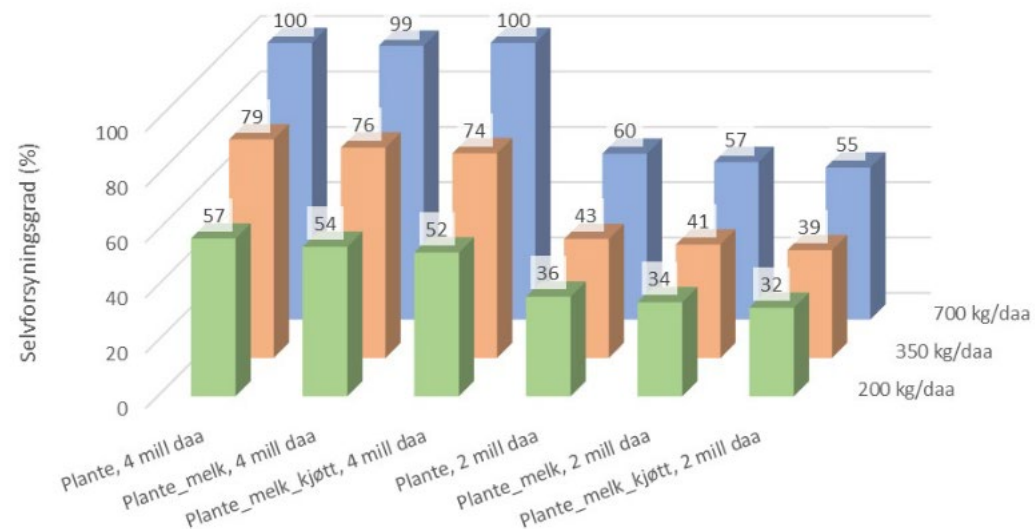
Målet



Figur 2. Matvareforbruk etter matvare og opprinnelse for seks scenarioer

Kilde: Mittenzwei og van Oort (2022) Hvordan øke selvforsyningsgraden i norsk jordbruk?

Potensialet

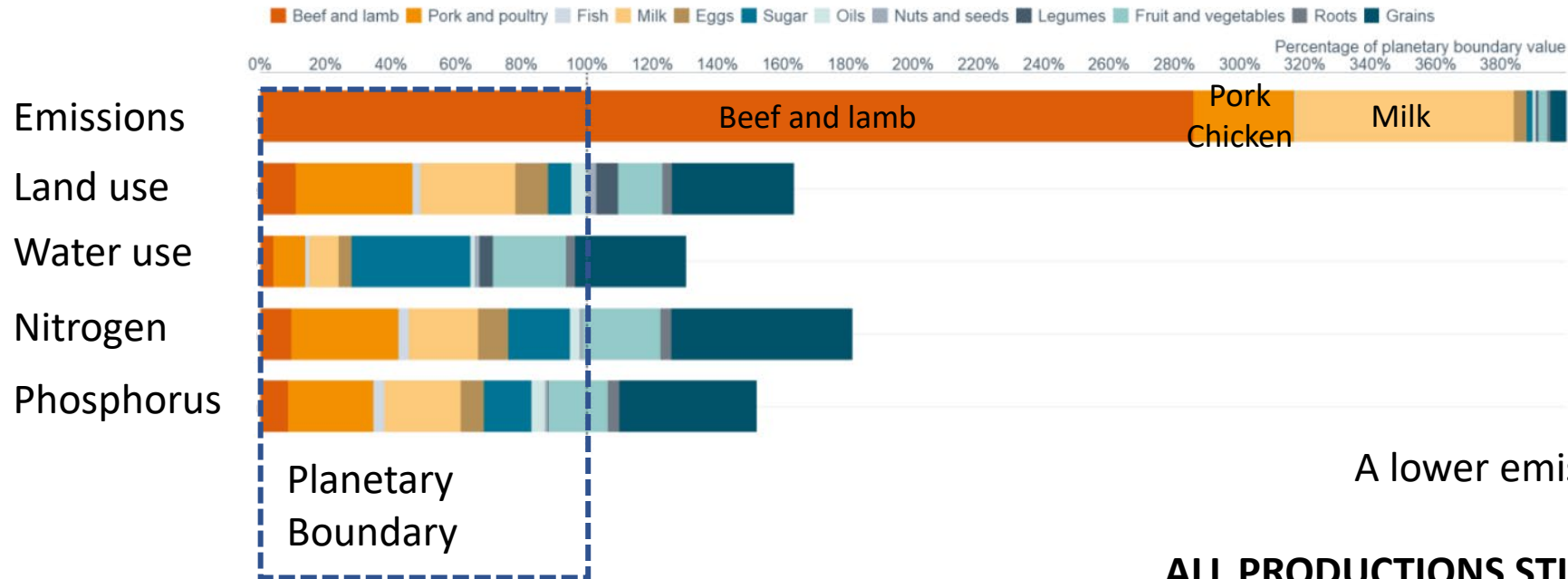


Figur 5.2. Selvforsyningsgrad for tre kostholdsalternativer basert på sjudoblet kostråd for fisk i 2050 under ulike forutsetninger for matvekstareal og avlingsnivå

Kilde: Bakken og Mittenzwei (2023) Produksjonspotensial i jordbruket og nasjonal sjølforsyning med mat. Utredning for Klimautvalget 2050

Gir et «klimasmart kosthold» andre problemer?

Norway



Source: upcoming Nordic Nutrition Recommendations 2022 background paper (Harwatt et al. 2023).



A lower emission diet ***does not solve everything!***

ALL PRODUCTIONS STILL requires many additional changes:

- Less fertilizer (pollution)
- Improved animal welfare
- Improved crop production
- Maintaining biodiversity
- Proper salaries, food prices, and working conditions

Hovedbudskap



- **Endringer** i matsystemet – spesielt utslipp, biomangfold, helse, er **nødvendig**
- Disse endringer **må ikke undergrave andre** behov og mål
- Disse andre behov og mål **må heller ikke undergrave** klima- miljø og biomangfolds **forpliktelser!**
- **Ærlig og informert debatt, og fleksibel, dynamisk leting eller løsninger**
- Mye er mulig, om vi **tilrettelegger** for det

°CICERO

Takk for oppmerksomhet

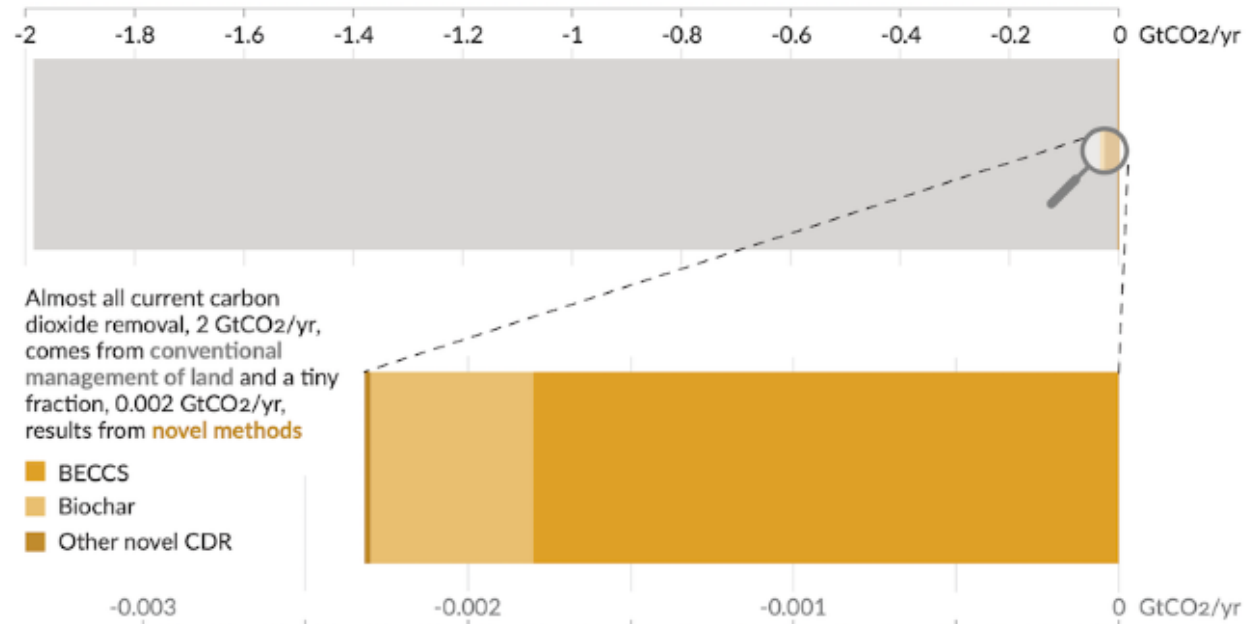
Bob van Oort

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Hva hvis vi IKKE endret kostholdet?

Only a tiny fraction of all current carbon dioxide removal results from **novel methods**

Total current amount of carbon dioxide removal, split into conventional and **novel methods** (GtCO₂/yr)



Almost all current carbon dioxide removal, 2 GtCO₂/yr, comes from conventional management of land and a tiny fraction, 0.002 GtCO₂/yr, results from **novel methods**

- BECCS
- Biochar
- Other novel CDR

Source: The State of Carbon Dioxide Removal (2023).

Sustainability aspects

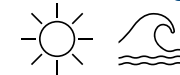
Environment, Fresh water, Health



Biodiversity



Climate change

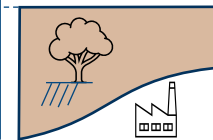


Population growth, development and diet change

GHG



CDR



Reduced CDR by biomass and soil, increasing CDR through technology

En mulig lokal løsning?

